REMARKS

Reconsideration and withdrawal of the rejections set forth in the Office Action mailed April 30, 2009 are respectfully requested in view of this response and amendment. Claims 1-12, 14-17 and 19 are pending in this application. Claims 1-12 and 14-18 have been rejected.

Claims 1, 14 and 15 have been amended for the sole reason of advancing prosecution. The claims have been amended to correct typographical errors and otherwise conform the claims to U.S. patent practice. Claim 15 has been amended to rewrite the claim in independent form. Claim 18 has been canceled without prejudice or disclaimer to the subject matter therein. Applicants, by amending or canceling any claims, make no admission as to the validity of any rejection made by the Examiner against any of these claims. Applicants reserve the right to reassert the original claim scope of any claim, in a continuing application.

Claim 19 is newly presented. The subject matter of newly presented claim 19 is supported throughout the specification, claims and figures as originally filed, at least by original claims 1 and 15, and Figs. 1C, 9 and 10C.

Support for the claims as amended appears throughout the specification, claims and figures as originally filed. It is respectfully submitted that the amendments do not introduce any new matter within the meaning of 35 U.S.C. §132.

In view of the following, further and favorable consideration is respectfully requested.

Claim Objections

The Examiner has objected to claims 1 and 18 as being duplicated claims, and objected to the claim marking of claim 4 in the Response filed February 19, 2009.

Response

By this Response and Amendment, claim 18 has been canceled without prejudice or disclaimer. Applicants present the remaining pending claims with proper markings with respect to the status of the claims. Accordingly the objections are moot; Applicants request reconsideration and withdrawal of these objections.

Claim Rejections under 35 U.S.C §101

The Examiner has rejected claims 1-12 and claims 15-17 under 35 U.S.C §101 as being directed to non-statutory subject matter.

Response

Independent claims 1 and 15 have been amended, and as amended, these rejections are respectfully traversed. Claims 2-12, 16 and 17 have been amended, or depend from amended claims, and as amended, these rejections are respectfully traversed. Claims 1 and 15 have been amended to recite a "computer-implemented method" and to stipulate that the method steps are performed by a computer, thereby tying the method to another statutory class. Amended claims 1 and 15 are now presented in similar form as previously presented claim 18 (now canceled), which Applicants note was not rejected under 35 U.S.C §101 in the Office Action.

Accordingly, Applicants submit that all of the claims, including claims 1-12 and 15-17 are directed to statutory subject matter, as defined in 35 U.S.C. §101 and within the interpretation provided under Supreme Court precedent and Federal Circuit decisions. Therefore, Applicants respectfully submit that the rejections under 35 U.S.C. §101 should be withdrawn.

Claim Rejections under 35 U.S.C. §103(a)

The Examiner has rejected claims 1-4 and 15-18 under 35 U.S.C. §103(a) as being

unpatentable over U.S. Patent Application Publication No. 2002/0042793 to Choi (hereinafter

referred to as "Choi") in view of U.S. Patent No. 4,839,853 to Deerwester et al. (hereinafter referred

to as "Deerwester et al.") and rejected claims 5-12 and 14 as being unpatentable over Choi, in view

of Deerwester et al. and further in view of U.S. Patent No. 6,128,613 to Wong et al. (hereinafter

referred to as "Wong et al.").

Response

Claim 18 has been canceled without prejudice or disclaimer to the contents; accordingly the

rejection of claim 18 is moot. Applicants respectfully traverse the remaining rejections since all of

the features of the presently claimed subject matter are not disclosed by the cited references.

To establish a *prima facie* case of obviousness, the Examiner must establish: (1) some

suggestion or motivation to modify the references exists; (2) a reasonable expectation of success;

and (3) the prior art references teach or suggest all of the claim limitations. *Amgen, Inc. v. Chugai*

Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); *In re Fine,* 5 USPQ2d 1596, 1598 (Fed. Cir.

1988); *In re Wilson,* 165 USPQ 494, 496 (CCPA 1970).

A *prima facie* case of obviousness must also include a showing of the reasons why it would be

obvious to modify the references to produce the present invention. *See Dystar Textilfarben GMBH v, C.*

H. Patrick, 464 F.3d 1356 (Fed. Cir. 2006). The Examiner bears the initial burden to provide some

convincing line of reasoning as to why the artisan would have found the claimed invention to have been

obvious in light of the teachings. *Id.* at 1366.

Overview

Independent claim 1 recites:

> A computer-implemented method of determining cluster attractors for use in clustering a plurality of documents, each document comprising at least one term, each term comprising one or more words, the method comprising: causing a computer to calculate, in respect of each term, a probability distribution that is indicative of the frequency of occurrence of one other term in the instance where a document comprises said term and said one other term, and in the instance where a document comprises said term and more than one other term, the respective frequency of occurrence of each other term, that co-occurs with said term in at least one of said documents; causing a computer to calculate, in respect of each term, the entropy of the respective probability distribution; causing the computer to select at least one of said probability distributions as a cluster attractor depending on the respective entropy value.

These features are not described nor rendered obvious by Choi or Deerwester et al., whether taken alone or in combination. Claims 2-12 depend directly or indirectly from claim 1.

Independent claim 15 recites:

> An apparatus for determining cluster attractors for use in clustering a plurality of documents, each document comprising at least one term, each term comprising one or more words, the apparatus comprising: means for calculating, in respect of each term, a probability distribution that is indicative of the frequency of occurrence of one other term in the instance where a document comprises said term and said one other term, and in the instance where a document comprises said term and more than one other term, the respective frequency of occurrence of each other term, the entropy of the respective probability distribution; and means for selecting at least one of said probability distributions as a cluster attractor depending on the respective entropy value.

These features are not described nor rendered obvious by Choi or Deerwester et al. or Wong et al., whether taken alone or in combination.

Independent claim 15 recites:

> A computer-implemented method of clustering a plurality of documents, each

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document comprising at least one term, each term comprising one or more words, the method comprising causing a computer to calculate, in respect of each term, a probability distribution that is indicative of the frequency of occurrence of one other term in the instance where a document comprises said term and said one other term, and in the instance where a document comprises said term and more than one other term, the respective frequency of occurrence of each other term, that co-occurs with said term in at least one of said documents; causing a computer to calculate, in respect of each term, the entropy of the respective probability distribution; causing the computer to select at least one of said probability distributions as a cluster attractor depending on the respective entropy value; causing the computer to compare each document with each cluster attractor; and causing the computer to assign each document to one or more cluster attractors depending on the similarity between the document and the cluster attractors.

These features are not described nor rendered obvious by Choi or Deerwester et al., whether taken alone or in combination. Claims 16 and 17 depend directly from claim 15.

Choi relates to "[a] method of order-ranking document clusters using entropy data and Bayesian self-organizing feature maps(SOM) is provided in which an accuracy of information retrieval is improved by adopting Bayesian SOM for performing a real-time document clustering for relevant documents in accordance with a degree of semantic similarity between entropy data extracted using entropy value and user profiles and query words given by a user, wherein the Bayesian SOM is a combination of Bayesian statistical technique and Kohonen network that is a type of an unsupervised learning." *See* Choi Abstract.

Deerwester et al. relates to "[a] methodology for retrieving textual data objects.... The information is treated in the statistical domain by presuming that there is an underlying, latent semantic structure in the usage of words in the data objects. Estimates to this latent structure are utilized to represent and retrieve objects. A user query is recouched in the new statistical domain and then processed in the computer system to extract the underlying meaning to respond to the query."

See Deerwester et al. Abstract.

Wong et al. relates to "[a] computer-based method and system for establishing topic words to represent a document, the topic words being suitable for use in document retrieval. The method includes determining document keywords from the document; classifying each of the document keywords into one of a plurality of preestablished keyword classes; and selecting words as the topic words, each selected word from a different one of the preestablished keyword classes, to minimize a cost function on proposed topic words. The cost function may be a metric of dissimilarity, such as cross-entropy, between a first distribution of likelihood of appearance by the plurality of document keywords in a typical document and a second distribution of likelihood of appearance by the plurality of document keywords in a typical document, the second distribution being approximated using proposed topic words. The cost function can be a basis for sorting the priority of the documents." *See* Wong et al. Abstract.

Clarification regarding the claims (as previously presented)

With regard to the Examiner's arguments in paragraph 12 (of page 4) of the Office Action concerning claim 1, Applicants respectfully note that the Examiner has mistakenly introduced an extra word into claim 1 that has seemingly caused the Examiner to break claim 1 down into separate features in a manner that distorts claim 1. Specifically, the Examiner has asserted one of the features of claim 1 as being "calculating, in respect of each term, a probability distribution," and a subsequent feature of claim 1 as being "**and** indicative of the frequency of occurrence of one other term in the instance where a document comprises said term and said one other term, and in the instance where a document comprises said term and more than one other term, the respective

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frequency of occurrence of each other term" (emphasis added, the bolded word "and" does not

appear in claim 1). However, claim 1 recites "calculating, in respect of each term, *a probability*

distribution indicative of the frequency of occurrence of one other term in the instance where a

document comprises said term and said one other term, *and* in the instance where a document

comprises said term and more than one other term, *the respective frequency of occurrence of each*

other term, that co-occurs with said term in at least one of said documents," (emphases added) from

which it can be seen that the phrase "indicative of the frequency... that co-occurs with said term in at

least one of said documents" is a definition of the recited probability distribution. As such, it is

respectfully submitted that these two phrases cannot be split into two separate features without

rendering each phrase incomplete and consequently distorting claim 1. To clarify this issue,

Applicant has introduced the phrase "that is" between "distribution" and "indicative" in claim 1 and

the independent claims 14, 15 and 19.

Similarly, the Examiner has combined the phrase "that co-occurs with said term in at least

one of said documents" recited in claim 1 with the feature "calculating, in respect of each term, the

entropy of the respective probability distribution," although it can be seen from the preceding

paragraph that the phrase "that co-occurs with said term in at least one of said documents" is also

part of the definition of the probability distribution.

Applicants also respectfully note that although the Examiner asserts at the top of page 5 of

the Office Action that Choi discloses the claim features of "and indicative of the frequency of

occurrence of one other term in the instance where a document comprises said term and said one

other term, and in the instance where a document comprises said term and more than one other term,

the respective frequency of occurrence of each other term," the Examiner also asserts midway down

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page 5 of the Office Action that "**Choi does not specifically discloses** [*sic*]: and indicative of the frequency of occurrence of one other term in the instance where a document comprises said term and said one other term, and in the instance where a document comprises said term and more than one other term" (bold emphasis added). Consequently, Applicants are not certain as to which features of claim 1 the Examiner is asserting as being described by Choi. If the rejection is to be maintained, Applicants respectfully request clarification in this regard.

Therefore, Applicants respectfully request that the Examiner take the foregoing submissions into account when considering the amended claims in light of the following comments.

Rejection of claims 1-4 and 15-18

Applicants respectfully submit that Deerwester et al. fails to cure the deficiencies of Choi with respect to the claimed subject matter in accordance with Applicants' independent claims 1 and 15, and further, does not suggest a teaching or motivation to reach such subject matter as claimed in the instant application. Applicants further respectfully submit that the cited prior art of record does not suggest a teaching or motivation to reach such subject matter as claimed in the instant application.

With regard to claim 1, Applicants disagree with the Examiner's assertion that Choi discloses "a… method of determining cluster attractors for a plurality of documents," as recited in the present claims. In contrast to the claimed subject matter, Choi does not use cluster attractors when clustering documents. Instead, Choi clusters documents by comparing documents to each other and putting documents that have a high similarity in the same cluster. *See* Choi paragraphs [0109] and [0110]; for example, "to group individual documents, a measure for clustering documents is needed.

As a measurement, similarity and dissimilarity between documents is used. Here, if similarity

between documents is employed as a measurement, documents having relatively higher similarity

are classified into the same group. If dissimilarity is employed, documents having relatively lower

dissimilarity are classified into the same group. The most fundamental method employing

dissimilarity between documents is to use distance between documents" (Choi explains the specific

manner in which he clusters documents by measuring their similarity/dissimilarity to one another in

Choi paragraphs [0111]-[0121]).

The Examiner has cited Choi paragraph [0126], but this paragraph relates to computing the

distance between clusters <u>after</u> the clusters have been formed. Therefore this paragraph does not

relate to cluster attractors, which are used to form the clusters and accordingly must be calculated

<u>before</u> the clusters are formed. The Examiner also refers to Choi paragraphs [0132] – [0134].

However, Choi merely describes the centroid linkage method which is a method of measuring the

distance between two clusters <u>that have already been formed</u> – *see* for example Choi paragraph

[0133] "as a distance between the two clusters c1 and c2, the distance between the centroids of the

two clusters is used" – i.e. the "centroid linkage method" referred to by Choi is performed <u>after</u> the

clusters have been formed and therefore does not relate to cluster attractors, which are required

<u>before</u> the clusters are formed. In this connection, the "centroid" mentioned by Choi in paragraphs

[0133] and [0134] can only be calculated <u>after</u> the cluster is formed (see for example the equation

given in paragraph [0133] in which centroids are calculated by using data relating to the documents

in the clusters that have already been formed). Therefore, the centroid is not the same as a cluster

attractor within the meaning of claim 1, since a cluster attractor is used to form the clusters and

accordingly must be identified before the cluster is formed. To help clarify this distinction,

Applicants have introduced the phrase "for use in clustering" into claim 1. *Applicants also respectfully remind the Examiner of the discussions during the Interview conducted December 5, 2008 in which distinction was made between a centroid and a cluster attractor; Applicants again refer the Examiner to Fig. 3 of the instant application, which distinguishes between a centroid and a cluster attractor.*

Applicants also respectfully disagree that Choi teaches to "calculate, in respect of each term, a probability distribution." In this connection, the Examiner cited Choi paragraphs [0028] and [0029]. However, Choi paragraph [0029] describes "prior information" in "the form of probability distribution" and it can be seen from Choi paragraph [0027] that this "prior information" is an initial value for a neural network. An initial value for a neural network has nothing to do with the terms, e.g. words, of the document and so in contrast to that recited in claim 1, Choi does not describe that a probability distribution is calculated "in respect of each term."

In particular, Choi does not describe the particular probability distribution recited in claim 1, namely a "*probability distribution that is indicative of the frequency of occurrence of one other term* in the instance where a document comprises said term and said one other term, *and* in the instance where a document comprises said term and more than one other term, *the respective frequency of occurrence of each other term that co-occurs with said term in at least one of said documents*" (emphases added). As mentioned above, in contrast to claim 1, the probability distribution referred to by Choi in paragraph [0029] has nothing to do with the terms of the document and therefore has nothing to do with the frequency of occurrence and/or co-occurrence of terms within documents.

The Examiner has also cited Choi paragraph [0060] in connection with this part of claim 1. However, Choi paragraph [0060] simply states that documents can be clustered by grouping

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documents with similar contents into the same cluster by a document clustering technique. As discussed above, this may be regarded as *teaching away from* claim 1 since claim 1 is concerned with determining cluster attractors for clustering documents, whereas Choi, as demonstrated in paragraph [0060], clusters documents by comparing their similarity with each other.

Applicants also respectfully disagree that Choi teaches to "calculate, in respect of each term, the entropy of each of the respective probability distribution... select at least one of said probability distributions as a cluster attractor depending on the respective entropy value," recited in claim 1. In this connection, the Examiner cited Choi paragraphs [0051] to [0053]. It can be seen from Choi paragraph [0052] (and paragraph [0028]) that Choi only describes calculating an entropy value for "query words given by user profiles with respect of key words for each of the documents." Therefore, Choi does not teach to calculate the entropy value of a probability distribution of any type, and particularly not a probability distribution of the type recited in claim 1. Accordingly, Choi cannot "select at least one of said probability distributions as a cluster attractor depending on the respective entropy." Firstly, because he does not use cluster attractors (instead documents are compared directly with one another) and secondly, because he does not calculate entropy values of any probability distributions.

Therefore, it is respectfully submitted that claim 1 is novel over Choi at least because of the above-discussed features.

With regard to Deerwester et al., Applicants respectfully submit that although Table 2 of Deerwester et al. describes nine technical document titles in a "term-by-document" matrix in which the frequency of occurrence of term in document j is recorded, Deerwester does not describe any of

the features cited in claim 1. Firstly, Deerwester et al. is not concerned with document clustering and so does not require cluster attractors or describe any method of determining cluster attractors. Secondly, Deerwester et al. does not teach to "calculate, in respect of each term, a probability distribution that is indicative of the frequency of occurrence of one other term in the instance where a document comprises said term and said one other term, and in the instance where a document comprises said term and more than one other term, the respective frequency of occurrence of each other term occurs with said term in at least one other said documents" as presently claimed. In this connection, it is noted in particular that Table 2 of Deerwester et al. describes actual frequencies of occurrence of the terms and documents and not probability distributions that are indicative of the frequency of occurrence of terms, as per claim 1. Further, because Deerwester et al. does not teach probability distributions, it cannot teach to calculate the entropy of the probability distributions. Also, because it does not use cluster attractors, Deerwester et al. cannot teach to "select a probability distribution as a cluster attractor depending on its respective entropy value" as presently claimed.

Accordingly, since neither Choi nor Deerwester et al. describe any of the above-discussed features of claim 1, it is respectfully submitted that their combined teachings would also not lead a person having ordinary skill in the art to subject matter of claim 1. Moreover, Choi and Deerwester et al. are not technically compatible with one another – Choi relates to document clustering while Deerwester et al. relates to retrieving textual data objects by user query by mapping all of the terms and documents from the document corpus into a semantic space. *See* Deerwester et al. col. 2, lines 24-40. Applicants respectfully submit that a person having ordinary skill in the art would not combine the teachings of these references, at least because they address entirely different issues.

Therefore, it is respectfully submitted that claim 1 is not obvious over the combined teachings of Choi and Deerwester et al.

With regard to claim 2, Applicants respectfully disagree that Choi describes a probability distribution within the meaning of claim 2 for the reasons stated above, namely that the probability distribution described by Choi relates only to the "prior information" to be used as an initial value for a neural network and not the frequency of occurrence of terms as recited in claim 1 (which definition of the probability distribution also applies to claim 2 which is dependent on claim 1).

Applicants respectfully disagree that Deerwester et al. describes any of the features of claim 2. In particular, Deerwester et al. does not describe making any calculations with respect to "co-occurring" terms as per claim 2. Deerwester et al. does not mention co-occurrence at all. The matrix shown in Table 2 and referred to in the passages at column 3, lines 34-65 and column 4, lines 1-9 as identified by the Examiner relate only to the frequency of occurrence of term i in document j and not at all to the co-occurrence of the terms in documents. In this connection, the Examiner also refers to column 10 in Table 6 of Deerwester et al. arguing that co-occurrence is demonstrated. Applicants respectfully disagree. In Table 6 Deerwester et al. does not present any data about term co-occurrence. Table 6 instead shows the results of a search where the query describes the user's information needs (for example looking for experts in "automatic representation of semantic structure" within a company) and the results list is a set of relevant research for this query. The numeric values in this table show how relevant a specific research group is to the query.

Therefore, Applicants respectfully submit that neither Choi nor Deerwester et al. teach, show or suggest the features of claim 2 and as such claim 2 is novel, non-obvious and consequently patentable, when compared to Choi and Deerwester et al. individually or combined.

With regard to Claim 3, the Applicants respectfully disagree that Choi describes a conditional probability distribution within the meaning of claim 3 for the reasons stated above, namely that the probability distribution described by Choi relates only to the "prior information" to be used as an initial value for a neural network and not the frequency of occurrence of terms as recited in claim 1 (which definition of the probability distribution also applies to claim 1, which is ultimately dependent on claim 1).

The Applicants respectfully disagree that Deerwester et al. describes any of the features of claim 3, in particular Deerwester et al. does not describe making any calculations with respect to "co-occurring" terms as per claim 3. Deerwester et al. does not mention co-occurrence at all. The matrix shown in Table 2 and referred to in the passages at column 3, lines 34-65, and column 4, lines 1-9 as identified by the Examiner relate only to the frequency of occurrence of term i in document j and not at all to the co-occurrence of terms in documents. In this connection the Examiner also refers to column 10 in table 6 of Deerwester et al. arguing that co-occurrence is demonstrated. Applicants respectfully disagree. In Table 6 Deerwester et al. does not present any data about term co-occurrence. Table 6 instead shows the results of a search where the query describes the user's information needs (for example looking for experts in "automatic representation of semantic structure" within a company) and the results list is a set of relevant research for this query. The numeric values in this table show how relevant a specific research group is to the query.

Therefore, Applicants respectfully submit that neither Choi nor Deerwester et al. describe the feature of claim 3 and as such claim 3 is both novel and non-obvious when compared to Choi and Deerwester et al. individually or combined.

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With regard to claim 4, as indicated above with reference to claim 2, neither Choi nor Deerwester et al. describe an indicator as defined in claim 2, or an indicator in respect of each co-occurring term. It follows that neither Choi nor Deerwester et al. describes the indicator of claim 4, since claim 4 incorporates all of the features of Claim 2. In particular, Applicants can find no reference in Deerwester et al. or Choi to the normalization of indicators with respect to the total number of terms in a document.

With regard to claim 15, claim 15 includes all of the features of claim 1 and has been amended to recited these explicitly. Therefore, it is respectfully submitted that claim 15 is novel and non-obvious over the individual combined teachings of Choi and Deerwester et al. for the reasons set out above in relation to claim 1.

Claim 15 additionally recites the features *"causing the computer to compare each document with each cluster attractor; and causing the computer to assign each document to one or more cluster attractors depending on the similarity between the document and the cluster attractors."* Choi does not describe these additional features of claim 15. This is because, as described above in relation to claim 1, Choi does not use cluster attractors when forming its clusters. Instead, Choi forms clusters by comparing documents to each other (see paragraph [0109] and [0110].

In connection with claim 15, the Examiner has highlighted the Abstract of Choi. It is respectfully submitted however that the Choi Abstract has no relevance to claim 15 because claim 15 recites a computer implemented method of clustering a plurality of documents, i.e. claim 15 relates to the formation of clusters. In contrast, the Choi Abstract describes "a method of order ranking document clusters", i.e. the Choi Abstract relates only to what happens <u>after</u> the clusters are

formed. As indicated previously, Choi describes a method of clustering, but this is achieved by comparing the similarities/dissimilarities between documents rather than determining cluster attractors in the manner defined in claim 15 and then comparing the documents to the cluster attractors as per claim 15. It is respectfully submitted that claim 15 is novel and non-obvious over the individual and combined teachings of Choi and Deerwester et al.

With regard to claim 16, Applicants respectfully disagree that Choi describes the features of claim 16. For the reasons given above in relation to claim 1, Choi does not describe probability distributions that are indicative of the frequency of occurrence of each term in a document, nor does he compare respective probability distributions of each document with each probability distribution selected as a cluster attractor. As explained previously, Choi does not use cluster attractors and the "centroid linkage" described by Choi cannot be regarded as a cluster attractor for the reasons set above in relation to claim 1, namely that Choi's centroid linkage method is a method of measuring the distance between clusters that have already been formed. Further, with regard to Deerwester et al., as explained above in relation to claim 1, although Deerwester et al. describes a Table recording the frequency of occurrence in terms of a document, these are not presented as probability distributions so Deerwester et al. does not provide any of the features of claim 16.

With regard to claim 17, Applicants respectfully disagree with the Examiner that Choi describes organizing the documents within each cluster. In this connection, the Examiner refers to Choi's title, but this relates to organizing the clusters themselves and not the documents within the clusters as per claim 17. Although Choi describes assigning weights, paragraph [0012] of Choi only describes assigning weights to each indexable word of extracted documents based on the number of occurrences of the inverted document. This is not the same as assigning a respective weight to each

document, the value of the weight depending on the similarity between the probability distribution

of the document and the probability distribution of the cluster attractor (not least because Choi does

not describe cluster attractors as outlined above). For similar reasons, Choi does not describe

assigning a respective weight to each pair of compared documents, the value of the weight

depending on the similarity between the compared respective probability distributions of each

document of the pair. Further, Choi does not describe the calculation of a minimum spanning tree

for the cluster based on respective calculated weights as per claim 17. In this connection, the

Examiner refers to paragraph [0098]. However, this paragraph only refers to suffix tree clustering

(STC), which is a clustering algorithm and has nothing to do with organizing documents within each

cluster attractor and moreover is not the same as a minimum spanning tree for a cluster, i.e. the STC

algorithm is for forming clusters and not for organizing clusters.

Rejection of claims 5-12 and 14

Applicants respectfully submit that Wong et al. fails to cure the deficiencies of Choi and

Deerwester et al. with respect to the claimed subject matter in accordance with Applicants'

independent claims 1 and 14, and further, does not suggest a teaching or motivation to reach such

subject matter as claimed in the instant application. Applicants further respectfully submit that the

cited prior art of record does not suggest a teaching or motivation to reach such subject matter as

claimed in the instant application.

With regard to claim 5, Applicants respectfully disagree with the Examiner that Choi, Deerwester et

al. and Wong et al. together describe the features of claim 5. Although Wong et al. describes

extracting a sub-set of words within a document, such extraction does not relate to selecting a

probability distribution as a cluster attractor as per claim 5 since neither Choi, nor Deerwester et al., nor Wong et al. use cluster attractors. With regard to claim 6, which is dependent on claim 5, the same comments apply as were made in relation to claim 5. Therefore, Applicants submit that claims 5 and 6 are novel, non-obvious and consequently patentable over Choi, Deerwester et al. and Wong et al., whether taken alone or in combination.

With regard to claim 7, the Examiner refers to paragraph [0105] of Choi, which mentions entropy. As discussed above in relation to claim 1, Choi only calculates an entropy value between key words of each web document and the user's query word and user profile (see for example paragraph [0028]). In contrast, claim 7 relates to an entropy value of a probability distribution of one or more terms from each sub-set (the probability distribution itself is further defined by claim 1 on which claim 7 depends indirectly). Therefore, Choi does not describe the calculation or use of the entropy of a probability distribution, or the specific probability distribution defined in claim 1 and recited in claim 7. Further, neither Choi, nor Deerwester et al., nor Wong et al., describe cluster attractors. Although Wong et al. describes a "satiable threshold" at col. 7, line 3, this threshold relates to a threshold for a weight assigned to an arc between two nodes of a word network. *See* Wong et al. col. 6, lines 64-66. Therefore, the threshold of Wong et al. does not relate to the subset of Wong et al. and so Wong et al. does not describe a threshold assigned to a subset, and particularly not an entropy threshold assigned to a sub set of terms. Therefore claim 7 is novel and non-obvious when compared to the combined teachings of Choi, Deerwester et al. and Wong et al.

With regard to claim 8, which depends on claim 7, the same submissions are made as were made in relation to claim 7.

With regard to claim 9, although Choi uses the word "frequencies" and contains a paragraph on "disjoint clustering," Choi's frequencies relate to the frequencies of key words used in the user search. Choi does not teach, show or suggest associating a frequency range with a sub-set. Also, claim 9 does not recite "disjoint clustering." Instead it recites that the "frequency ranges for respective subsets are disjoint" – in contrast, Choi describes that the clusters are disjoint and not that frequency ranges are disjoint (notwithstanding the fact that Choi does not describe frequency ranges). Wong et al. also is deficient in describing associating frequency ranges with its subsets.

With regard to claims 10, 11 and 12, similar comments apply as were made in relation to claims 5, 7 and 9.

Therefore, it is respectfully submitted that claims 9-12 are novel, non-obvious and consequently patentable over Choi, Deerwester et al. and Wong et al., whether taken alone or in combination.

With regard to independent claim 14, claim 14 is an apparatus claim reciting, *inter alia*, features corresponding to the features discussed above with respect to method claim 1. Applicants therefore submit that claim 14 is novel, non-obvious and consequently patentable over Choi and Deerwester et al. (and Wong et al.) for the reasons discussed above in relation to claim 1.

Newly presented claim 19

Newly presented claim 19 is an apparatus claim reciting, *inter alia*, features corresponding to the features discussed above with respect to method claim 15. Applicants respectfully submit that claim 19 is novel, non-obvious and consequently patentable over Choi and Deerwester et al. (and Wong et al.) for the reasons discussed above in relation to claim 15.

CONCLUSION

In light of the foregoing, Applicants submit that the application is in condition for allowance.

If the Examiner believes the application is not in condition for allowance, Applicants respectfully request that the Examiner call the undersigned.

In the event this paper is not timely filed, Applicants hereby petition for an appropriate extension of time. Please charge any fee deficiency or credit any overpayment to Deposit Account No. 14-0112.

Respectfully submitted,

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